

**VIRGINIA POLLUTION ABATEMENT  
PERMIT APPLICATION**

**FORM C  
INDUSTRIAL WASTE**

**Department of Environmental Quality**

**VPA FORM C  
INDUSTRIAL WASTE  
INSTRUCTIONS**

This form is to be completed by applicants requesting a VPA permit for industrial waste management systems. All industrial applicants must submit Part I of Form C. Part II must be submitted by applicants who use land application treatment systems for wastewater or sludge. In addition, certain industrial categories may be required to submit more information than this application requests. A preliminary meeting with the local DEQ Regional Office is recommended prior to completing any part of Form C.

**PART C-I**

1. **FACILITY NAME:** Name as given on Form A line 1.
2. **SOURCE OF WASTE:**
  - a. The applicant should supply a short description of the specific manufacturing operation at the facility.
  - b. A line drawing, in block diagram form, is to be furnished. Show the various steps or units of the manufacturing or processing operations, all points where industrial wastes or other wastes are produced, the volume of wastes generated at each location, and their method of disposal. List raw materials and show the points where they enter the process. Finished products and the points where they emerge from the process are also to be shown.
  - c. Describe how sewage from employees is handled. (i.e., does it go to a septic tank/drainfield, local sanitary sewerage system, etc.).
  - d. In the space provided, show the maximum and average hours/day and days/week of operation and the specific months of operation.
3. **NON-HAZARDOUS DECLARATION:** All industrial facilities must sign this declaration in order for the application to be complete. The signature must be in accordance with DEQ's Permit Regulation. The applicant should evaluate waste characteristics as required by Federal and State Regulations to determine if it is hazardous or non-hazardous (TCLP or other tests required by Department of Environmental Quality). If identified as hazardous, it should be processed as a hazardous waste according to the requirements of RCRA and State Regulations through the Department of Environmental Quality.
4. **WASTE CHARACTERIZATION:** Waste characterization applies to waste being removed from the waste management system. For land application operations, analysis should be conducted on waste to be land applied. For proposed operations, estimates may be used based on the characteristics of similar facilities. Provide the references to identify the similar facility.

The applicant is required to test for all parameters listed in 4.a. and/or 4.b., whichever group of parameters are appropriate. Should you feel that any of the required parameters are not appropriate for your operation, you may request in writing that the testing requirement be waived. The letter should accompany the VPA application when a submission is made. It must be pointed out that your waiver request should be reviewed with a DEQ Regional Office permit writer before the waiver is requested. Enough information must be available on characteristics of the waste to support issuance of

the VPA permit. If the waiver request is denied, then the entire application package will be returned incomplete.

DEQ places great importance on waste characterization. In Item 4.c., the applicant is requested to indicate if a parameter (not listed in 4.a. and/or 4.b.) is believed present or absent. If believed present, at least one analysis should be conducted. If the application is for both wastewater and sludge, make an additional copy of Part 4.c and answer for both.

If the application is for a waste management system that uses recycling, the waste characterization may be substituted by supporting documentation, for example, MSDS sheets.

5. **POLLUTANT MANAGEMENT FACILITIES:** Provide a detailed flow chart in block diagram form showing the interrelation of all the treatment facilities. Include handling, treatment storage and disposal units in this chart. Recycle systems are also to be included for this application requirement.

**OPERATIONS:** Using the above flow diagram as a reference, describe the pollutant management operation of each unit and the system as a whole.

6. Please indicate the type and number of waste treatment units or storage facilities at your operation. Please also indicate if the facility is proposed or existing.
7. All waste treatment, storage facilities and land application sites must be approved by the Department of Environmental Quality. If the existing facilities have not been approved, it will be necessary to submit a conceptual engineering report. It is also suggested that you discuss this matter with a representative of a DEQ Regional Office before submitting the report.
8. If previously approved facilities have been expanded, a conceptual engineering report must be submitted to DEQ for approval for the expanded unit(s) as required by the application and instructions.
9. **CONCEPTUAL DESIGN:** Waste management facilities require technical expertise in the planning, design and construction phases of the project to insure that 1) the facility will meet the operational needs of the owner, 2) the facility is structurally sound and 3) the treatment system meets all necessary regulatory requirements. Detailed discussion of plans and specifications for the structural stability of the treatment works are beyond the scope of these instructions. Such expertise is available to owners through private engineering firms and Virginia universities. It should be emphasized that the structural integrity of all facilities is the responsibility of the owner.

Applicants should provide design information and/or calculations such as capacities, construction materials, flow directions, loading rates and water balance figures for the waste management structure and any associated piping and pumps. The following areas should be considered in preparing the conceptual design.

**STORAGE/TREATMENT FACILITY CAPACITY:** Facilities must be designed and operated to prevent point source discharge of pollutants to State waters except in the case of a 25 year-24 hour or greater storm event.

DEQ recommends the storage capacity be sufficient to ensure that wastes do not have to be applied to the land when the ground is ice or snow covered, too wet or during periods when fields are unavailable for waste utilization because of the cropping plan. A minimum 60-day storage capacity for wastewater or sludge is recommended to be designed into all pollution abatement facilities.

DEQ suggests that the storage facilities have a 2 ft. freeboard at all times.

**GROUND WATER PROTECTION:** Storage facilities and treatment works must be designed and operated to ensure compliance with the provisions of the Water Quality Standards for ground water. DEQ suggests that liners be installed in earthen storage facilities located in rapidly permeable soils (> 2.0 in/hr) or where Karst geology or shallow and fractured rock is encountered.

The Department of Environmental Quality requires lagoon liners to have a maximum coefficient of permeability of  $1 \times 10^{-6}$  cm/sec. It is recommended that soils used as liners be capable of achieving a maximum coefficient of permeability of  $1 \times 10^{-7}$  cm/sec or less. Total soil liner thickness should be one foot after compaction of two separate lifts of equal thickness.

Synthetic liners are preferred and should be a minimum of 20 mil. thickness, appropriate for the type wastewater, and be appropriately protected from puncture both below and above the liner. The liner should clearly be installed according to manufacturers specifications. Such specifications should also include recommendations, if any, for periodically inspecting the integrity of the liner.

A 2-foot separation distance between the facility bottom and the seasonal high water table is recommended.

**WASTE VOLUMES:** Accurate estimates of waste volumes are necessary to calculate properly sized waste holding and treatment facilities. Wastewater from contaminated storm water inputs to the pollution abatement facilities must also be considered, i.e., rainfall on to the facility surface and runoff from the surrounding roof and guttering systems.

10. **FLOOD POTENTIAL:** DEQ recommends that waste storage structures not be located on a floodplain unless protected from inundation or damage by a 100-year frequency flood event. Consult your local county zoning/planning office for information on flood plain locations and flood protection options. Such information may be available upon request.
11. Storm water runoff may be generated by parking lots, plant roofs or by the surrounding terrain. Proposed or existing facilities should be designed to contain the runoff from a 25 year 24 hour rain storm.
12. **LAND APPLICATION OF WASTES:** Facilities which land apply waste must complete Part C-II.

## **PART C-II**

If instructions beyond those in the form are needed, contact the DEQ Regional Office for assistance.

**VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION**

**FORM C**

**INDUSTRIAL WASTE**

**PART C-I General Information**

1. Facility Name: \_\_\_\_\_

2. Source(s) of Waste

- a. *Provide a narrative which explains your facility operations and how wastes are produced.*

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- b. *Attach a line drawing of the facility in block diagram for showing the manufacturing or processing operations and all points where wastes are produced.*

- c. *Explain how sewage from employees is handled (i.e., septic tank/drainfield, sanitary sewer etc.):*

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d. *Operational Parameters*

*Maximum hours/day of operation:* \_\_\_\_\_

*Average hours/day of operation:* \_\_\_\_\_

*Days/week of operation:* \_\_\_\_\_

*Specific months of operation:* \_\_\_\_\_

3. Non-Hazardous Declaration

a. *Statement for Plant Operations*

*Is any part of the manufacturing operations, plant processes or waste treatment facilities at these plant facilities under the purview of the "Virginia Hazardous Waste Management Regulations" or the "Virginia Solid Waste Management Regulations?"*

\_\_\_\_\_ Yes \_\_\_\_\_ No.

*If Yes, please provide a brief explanation of the type of permit or requirements that apply.*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- b. *For waste to be land applied, a responsible person, as defined by VR680-14-01, must sign the following statement.*

**I certify that the waste described in this application is non-hazardous and not regulated under the Resource Conservation and Recovery Act.**

\_\_\_\_\_  
**(Signature of Owner)**

\_\_\_\_\_  
**Date**

#### 4. Waste Characterization

- a. *Wastewater - Provide at least one analysis for each parameter. Upon review, additional analyses may be required by DEQ.*

<u>Parameter</u>	<u>Concentration</u>	
Flow to treatment	_____	MGD
Flow to storage	_____	MGD
Vol. to treatment	_____	MG
Vol. to storage	_____	MG
Vol. Land applied	_____	MG/year
BOD <sub>5</sub>	_____	mg/l
COD	_____	mg/l
TOC	_____	mg/l
TSS	_____	mg/l
Percent Solids	_____	%
pH	_____	S.U.
Alkalinity as CaCO <sub>3</sub>	_____	mg/l
Nitrogen, (Nitrate)	_____	mg/l
Nitrogen, (Ammonium)	_____	mg/l
Nitrogen, (Total Kjeldahl)	_____	mg/l
Phosphorus, (Total)	_____	mg/l
Potassium, (Total)	_____	mg/l
Sodium	_____	mg/l
	_____	mg/l

- b. *Sludge - Provide at least one analysis for each parameter. Upon review, additional analyses may be required by DEQ.*

<u>Parameter</u>	<u>Concentration*</u>	
Percent Solids	_____	%
Volatile Solids	_____	%
pH	_____	S.U.
Alkalinity as CaCO <sub>3</sub> **	_____	mg/kg
Nitrogen (Nitrate)	_____	mg/kg
Nitrogen (Ammonium)	_____	mg/kg
Nitrogen (Total Kjeldahl)	_____	mg/kg
Phosphorous (Total)	_____	mg/kg
Potassium (Total)	_____	mg/kg
Lead	_____	mg/kg
Cadmium	_____	mg/kg
Copper	_____	mg/kg
Nickel	_____	mg/kg
Zinc	_____	mg/kg
	_____	mg/kg

\* Unless otherwise noted, report results on dry weight basis.

\*\* Lime treated sludges (10% or more lime by dry weight) should be analyzed for percent CaCO<sub>3</sub>.

- c. *Provide a separate waste characterization listing for each wastewater and sludge generated at the facility. Insert "Yes" beside all parameters believed present and provide at least one analysis for each. Insert "No" beside all parameters believed not present. Indicate "NA" for any parameter already addressed in Item 4a. or 4b.*

<u>Parameter</u>	<u>Believed Present</u> (yes or no)	<u>Concentration*</u>
Sodium	_____	_____
Bromide	_____	_____
Total Residual	_____	_____
Chlorine	_____	_____
Fecal Coliform	_____	_____
Fluoride	_____	_____
Oil & Grease	_____	_____
Total	_____	_____
Radioactivity	_____	_____
Total Alpha	_____	_____
Total Beta	_____	_____
Total Radium	_____	_____
Total Radium 226	_____	_____
Sulfate (as SO <sub>4</sub> )	_____	_____
Sulfide (as S)	_____	_____
Sulfite (as SO <sub>3</sub> )	_____	_____
Surfactants	_____	_____
Total Aluminum	_____	_____
Total Barium	_____	_____
Total Boron	_____	_____
Total Cobalt	_____	_____
Total Iron	_____	_____
Total Magnesium	_____	_____
Total Molybdenum	_____	_____
Total Manganese	_____	_____
Total Tin	_____	_____
Total Titanium	_____	_____
Total Antimony	_____	_____
Total Arsenic	_____	_____
Total Beryllium	_____	_____
Total Cadmium	_____	_____
Total Chromium	_____	_____
Total Copper	_____	_____
Total Lead	_____	_____
Total Mercury	_____	_____
Total Nickel	_____	_____
Total Selenium	_____	_____
Total Silver	_____	_____
Total Thallium	_____	_____
Total Zinc	_____	_____
Total Cyanide	_____	_____
Total Phenols	_____	_____
Dioxin	_____	_____
Acrolein	_____	_____

\*If the analysis is for sludge, report results on dry weight basis.



C. (Continued)

<u>Parameter</u>	<u>Believed Presen</u> (yes or no)	<u>Concentration</u>
Acrylonitrile	_____	_____
Benzene	_____	_____
Bis(Chloromethyl)Ether	_____	_____
Bromoform	_____	_____
Carbon Tetrachloride	_____	_____
Chlorobenzene	_____	_____
Chlorodibromomethane	_____	_____
Chloroethane	_____	_____
2-Chloroethylvinyl Ether	_____	_____
Chloroform	_____	_____
Dichlorobromomethane	_____	_____
Dichlorodifluoromethane	_____	_____
1,1-Dichloroethane	_____	_____
1,2-Dichloroethane	_____	_____
1,1-Dichloroethylene	_____	_____
1,2-Dichloropropane	_____	_____
1,3-Dichloropropylene	_____	_____
Ethylbenzene	_____	_____
Methyl Bromide	_____	_____
Methyl Chloride	_____	_____
Methylene Chloride	_____	_____
1,1,2,2-Tetrachlorethane	_____	_____
Tetrachloroethylene	_____	_____
Toluene	_____	_____
1,2-TransDichloroethylene1	_____	_____
1,1,-Trichloroethane	_____	_____
1,1,2,-Trichloroethane	_____	_____
Trichloroethylene	_____	_____
Trichlorofluoromethane	_____	_____
Vinyl Chloride	_____	_____
2-Chlorophenol	_____	_____
2,4-Dichlorophenol	_____	_____
2,4-Dimethylphenol	_____	_____
4,6-Dinitro-O-Cresol	_____	_____
2,4-Dinitrophenol	_____	_____
2-Nitrophenol	_____	_____
4-Nitrophenol	_____	_____
P-Chlor-M-Cresol	_____	_____
Pentachlorophenol	_____	_____
Phenol	_____	_____
2,4,6-Trichlorophenol	_____	_____
Acenaphthene	_____	_____
Acenaphthylene	_____	_____
Acenaphthylene	_____	_____
Benzidine	_____	_____
Benzo(a)Athracene	_____	_____
Benzo(a)Pyrene	_____	_____
3,4-Benzofluoranthene	_____	_____
Benzo(ghi) Perylene	_____	_____
Benzo(k)Fluoranthene	_____	_____
Bis(2-Chloroethoxy)Methane _____	_____	_____
Bis(2-Chloroethyl) Ether	_____	_____
Bis(2-Chloroisopropyl)Ether	_____	_____
Bis(2-Ethylhexyl)Phthalate	_____	_____
4-Bromophenyl Phenyl Ether _____	_____	_____
Butyl Benzyl Phthalate	_____	_____
4-Chlorophenyl Phenyl Ether _____	_____	_____
2-Chloronaphthalene	_____	_____
Chrysene	_____	_____
Dibenzo(a,h) Anthracene	_____	_____

c. (Continued)

<u>Parameter</u>	<u>Believed Present</u> (yes or no)	<u>Concentration</u>
1,2-Dichlorobenzene	_____	_____
1,3-Dichlorobenzene	_____	_____
1,4-Dichlorobenzene	_____	_____
3,3'-Dichlorobenzidine	_____	_____
Diethyl Phthalate	_____	_____
Dimethyl Phthalate	_____	_____
Di-N-Butyl Phthalate	_____	_____
2,4-Dinitrotoluene	_____	_____
2,6-Dinitrotoluene	_____	_____
Di-N-Octyl Phthalate	_____	_____
1,2-Diphenylhydrazine(as Azobenzene)	_____	_____
Fluoranthene	_____	_____
Fluorene	_____	_____
Hexachlorobenzene	_____	_____
Hexachlorobutadiene	_____	_____
Hexachlorocyclopentadiene	_____	_____
Hexachloroethane	_____	_____
Indeno(1,2,3-cd)Pyrene	_____	_____
Isophorone	_____	_____
Naphthalene	_____	_____
Nitrobenzene	_____	_____
N-Nitrosodimethylamine	_____	_____
N-Nitrosodi-N-Propylamine	_____	_____
N-Nitrosodiphenylamine	_____	_____
Phenanthrene	_____	_____
Pyrene	_____	_____
1,2,4 - Trichlorobenzene	_____	_____
Aldrin	_____	_____
α- BHC	_____	_____
β- BHC	_____	_____
γ- BHC	_____	_____
δ- BHC	_____	_____
Chlordane	_____	_____
4,4'- DDT	_____	_____
4,4'- DDE	_____	_____
4,4'- DDD	_____	_____
Dieldrin	_____	_____
α-Endosulfan	_____	_____
β-Endosulfan	_____	_____
Endosulfan Sulfate	_____	_____
Endrin	_____	_____
Endrin Aldehyde	_____	_____
Heptachlor	_____	_____
Heptachlor Epoxide	_____	_____
PCB - 1242	_____	_____
PCB - 1254	_____	_____
PCB - 1221	_____	_____
PCB - 1232	_____	_____
PCB - 1248	_____	_____
PCB - 1260	_____	_____
PCB - 1016	_____	_____
Toxaphene	_____	_____
Chloromethane	_____	_____
Chlorpyrifos	_____	_____
Demeton	_____	_____
Dichloromethane	_____	_____
(2,4-dichlorophenoxy) acetic acid (2,4-D)	_____	_____
Di-2-Ethylhexyl Phthalate	_____	_____
MBAS	_____	_____

## c. (Continued)

<u>Parameter</u>	<u>Believed Present</u> (yes or no)	<u>Concentration</u>
Lindane	_____	_____
Hydrogen Sulfide	_____	_____
Silvex	_____	_____
Tributyltin	_____	_____
Kepone	_____	_____
Malathion	_____	_____
Methoxychlor	_____	_____
Mirex	_____	_____
Monochlorobenzene	_____	_____
Parathion	_____	_____

d. Provide a separate waste characterization listing for each wastewater and sludge generated at the facility. List any additional parameters believed present in the spaces provided below and provide at least one analysis for each.

[illegible]

5. Briefly describe the design and provide a line drawing of the waste treatment facility which relates the various components of the treatment system including source(s), treatment unit(s), disposal alternatives, and flow estimates from the various process units.

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6. Indicate the number and type of waste storage facilities. If existing, indicate the volume; DEQ may require additional information upon review.

No.	Existing (Volume)	Proposed
___ Earthen Storage Pond	_____	_____
___ Storage Pit	_____	_____
___ Storage Tank	_____	_____
___ Anaerobic Lagoon	_____	_____
___ Other	_____	_____
	_____	_____

7. Have the existing storage/treatment facilities identified in Item 5 and 6 above been previously approved by the Department of Environmental Quality?  
Yes\_\_\_\_\_ No\_\_\_\_\_

*If yes, provide the date of the approval and proceed to Item 8.*

*Approval Date:\_\_\_\_\_*

*If no, provide information required by Items 9, 10, and 11.*

8. Have the previously approved facilities been altered or expanded?  
Yes\_\_\_\_\_ No\_\_\_\_\_

*If yes, it will be necessary to provide the information for such facilities, as required by Items 9 & 10, and 11.*

*If no, proceed to Item 12.*

9. Provide conceptual design for the treatment facilities including design approach used. Explain how ground water will be protected. Demonstration should include soil evaluation, geology, hydrology, and topography. The following information must be provided for each proposed facility identified in Item 6 above and for those existing facilities in Items 7 and 8 which have not been either previously approved or were altered:

*a. Design calculations for volume (ft<sup>3</sup>) and estimated days of storage*

*b. Description of lining material and permeability*

*c. Plan and cross-sectional views*

*d. Depth to seasonal high water table and separation to permanent water table.*

10. Will the proposed waste storage/treatment facilities be located within the 100-year flood plain? \_\_\_\_Yes \_\_\_\_No.

*If yes, what is the elevation of the 100-year flood plain and elevation of the proposed facilities. Also, how will the waste storage facilities be protected from flooding? (Flood elevation can be obtained from your local county zoning/planning department).*

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11. Will the proposed or existing storage/treatment facilities receive any storm water runoff? \_\_\_\_Yes \_\_\_\_No.

*If yes, provide total area (square feet, acres, etc.) from which runoff will occur and indicate this area on the line drawing (Item 5).*

*Total area:* \_\_\_\_\_

*Dimensions:* \_\_\_\_\_

12. Will any part of the waste generated at your facility be land applied? Yes \_\_\_\_ No \_\_\_\_\_. If yes, Part C-II must be completed.

# VIRGINIA POLLUTION ABATEMENT PERMIT APPLICATION

## FORM C

### INDUSTRIAL WASTE

#### PART C-II Land Application and Waste Handling Procedure

Facility Name: \_\_\_\_\_

*Items 1-12 pertain to the land application of industrial sludge/wastewater at frequent and infrequent rates. The applicant may request a waiver in writing for any of the required information if it is not pertinent to their operation.*

1. For each land application site provide a topographic map of sufficient scale (5 foot contour preferred) clearly showing the location of the following features within 0.25 mile of the site. Provide a legend with approximate scale. (See General Instructions for map requirements.)
  - a. *Proposed or existing ground water monitoring wells*
  - b. *General direction of ground water movement*
  - c. *Water wells, abandoned or operating*
  - d. *Surface water*
  - e. *Springs*
  - f. *Public water supply(s)*
  - g. *Sink holes*
  - h. *Underground and/or surface mines*
  - i. *Mine pool (or others) surface water discharge points*
  - j. *Mining spoil piles and mine dumps*
  - k. *Quarry(s)*
  - l. *Sand and gravel pits*
  - m. *Gas and oil wells*
  - n. *Diversion ditch(s)*
  - o. *Agricultural drainage ditch(s)*
  - p. *Occupied dwellings, including industrial and commercial establishments*
  - q. *Landfills or dumps*
  - r. *Other unlined impoundments*
  - s. *Septic tanks and drainfields*
  - t. *Injection wells*
  - u. *Rock outcrops*
  - v. *Soil boring or test pits locations*
  - w. *Subsurface drainage tile*

2. For each land application site provide a site plan of sufficient detail to clearly show any landscape features which will require buffer zones or may limit land application. Provide a legend and clearly mark the field boundaries and property lines. The following landscape features should be delineated. (See General Instructions for map requirements.)
  - a. *Drainageways*
  - b. *Rock outcrops*
  - c. *Sink holes*
  - d. *Drinking water wells and springs*
  - e. *Monitoring wells*
  - f. *Property lines*
  - g. *Roadways*
  - h. *Occupied dwellings*
  - i. *Slopes (greater than 8% by slope class)*
  - j. *Wet spots*
  - k. *Severe erosion (SCS designation)*
  - l. *Frequently flooded soils (SCS designation)*
  - m. *Surface waters*
3. Provide a complete description of agronomic practices for each crop to be grown, on field-by-field basis including a nutrient management program, soil and/or plant tissue testing, and the coordination of tillage practices, planting and harvesting schedules and timing of land application.
4. Describe all land application methods and any equipment used in the process.
5. Provide a detailed soil survey map, preferably photographically based, with the field boundaries clearly marked. (A USDA-SCS soil survey map should be provided, if available.)

Provide a detailed legend for each soil survey map which uses accepted USDA-SCS descriptions of the typifying pedon for each soil series (soil type). Complex associations may be described as a range of characteristics. Soil descriptions should include the following information.

- a. *Soil symbol*
- b. *Soil series, textural phase and slope class*
- c. *Depth to seasonal high water table*
- d. *Depth to bedrock*
- e. *Estimated productivity group (for the proposed crop rotation).*
- f. *Estimated infiltration rate (surface soil)*
- g. *Estimated permeability of most restrictive subsoil layer*

6. Representative soil borings for frequent land application and fixed spray irrigations, (to no less than 5 ft. or to the water table) are to be conducted for the typifying pedon of each soil series (soil type) and the following data collected and tests performed. All results for infiltration and permeability tests should be enclosed. Provide information on the items below:
  - a. *Soil symbol*
  - b. *Soil series, textural phase and slope class*
  - c. *Depth to seasonal high water table*
  - d. *Depth to bedrock*
  - e. *Estimated productivity group (for the proposed crop rotation).*
  - f. *Estimated infiltration rate (surface soil)*
  - g. *Estimated permeability of most restrictive subsoil layer*
7. Representative soil samples are to be collected for each major soil type and analyzed for the soil parameters indicated on Page C-II-6. Samples are to be taken at a depth of 0-6 in.
8. Land Area Determination:
  - a. *Land area requirements are to be calculated and justified for each of the parameters listed below:*

<u>Parameters</u>	<u>Method of Determining Required Area</u>
1. Nitrogen	Crop uptake, immobilization denitrification, leaching
2. Phosphorus	Crop uptake, soil adsorption
3. Potassium	Crop uptake
4. Sulfur	Crop uptake, soil adsorption leaching
5. Salts	Sodium Adsorption Ratio (SAR), leaching
6. Carbon/Nitrogen Ratio	
7. Metals(Ni, Cu, Zn, Pb, Co, Cd or other)	Cumulative loading for site life
8. Anions (As, B, Chlorides)	Leaching, Soil Adsorption
9. Calcium Carbonate Equivalency	Soil pH management
10. Other Parameters (As needed or as requested by DEQ)	



For each parameter and method of assimilation, (i.e. crop uptake, denitrification, immobilization, soil adsorption leaching, etc.), the required land area is to be justified by attaching calculations and appropriate references. Allowances for soil adsorption are to be justified by pertinent soil testing.

Provide calculations describing the nutrient value of the waste as lbs per dry ton or mg/l nitrogen (PAN), phosphorus ( $P_2O_5$ ), potassium ( $K_2O$ ), and any liming effects which may occur from land application.

*b. Land area requirements for application of industrial wastewater or liquid sludge are to be determined and an annual water balance on a monthly basis developed integrating the following factors:*

1. *Monthly precipitation*
2. *Monthly evapotranspiration data*
3. *Soil percolation rates (from subsurface permeability data)*
4. *Monthly wastewater loading*
5. *Monthly storage requirement*
6. *Monthly storage input/drawdown*

9. Does the volume of wastewater generated as determined by the water balance in 8.b. exceed the hydraulic loading rate (inches/acre/year) of the soils? \_\_\_\_Yes \_\_\_\_No

*If Yes, explain how excess loading will be disposed of:*

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10. Is the land application site owned by the applicant? \_\_\_\_Yes\_\_\_\_No.

*If No, answer question 11 and have the land owner complete the authorization form, Page C-II-5.*

11. Complete page C-II.5 by providing the name(s), address(es), site locations and signatures of non-applicant land owner on whose property industrial waste will be applied (A separate approval will be required for each additional owner.):

**AUTHORIZATION TO LAND APPLY WASTE**  
(Land Owner must sign and date this approval)

As land owner, I authorize \_\_\_\_\_ to land apply wastewater/sludge to my property in accordance with their VPA Form C application. This authorization will remain in effect until such time as I notify the Department of Environmental Quality in writing that this authorization has been withdrawn.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

Site Location(s) \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_